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THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

Volume XXV Number 16

September 1, 1941

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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DIVISION OF MYCOLOGY AND DISEASE SURVEY

Volume XXV September 1, 1941 Number 16

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ANTHRACNOSE DISEASE IN MARYLAND TOBACCO PLANT BEDS

E. A. Walker and S. E. Wise

A peculiar leaf spot was observed May 24 on young tobacco plants in a paradichlorbenzene gas treated plant bed, on a farm at Waldorf, Charles County, Maryland. Examination of untreated beds nearby showed similar spots. These spots had a washed out, ashen gray, papery appearance and were thought at first to result from nitrate of soda burn. Some wildfire [Phytomonas tabaci] spots were also present on tobacco leaves of neighboring plants. Leaf samples were collected and laboratory diagnosis made for possibility of bacterial and fungal invasion. Several bacteria were at first isolated but failed to produce the disease when inoculated into healthy tobacco plants. On 3 percent malt agar, a fungus belonging to the genus Colletotrichum was consistently isolated.

Many tobacco beds were later visited and this leaf spot was found rather generally distributed in Charles and Prince Georges Counties. In several beds seedling blight was so severe that small areas were brown with drying leaves and dead plants. A similar leaf spot was found in the college tobacco greenhouse where 64 strains of Maryland tobacco were being grown. It became so destructive by the end of May that only a few plants were left from some seed lots. Isolations from the diseased plants yielded cultures of Colletotrichum sp.

On June 14 this disease was noticed at Pomfret, Charles County, in one old bed, heat-sterilized, situated at the edge of woodland, which was being sprayed for blue mold control. About 4000 plants were set from this bed, after which it was not used again since the growth of the plants in the field was poor. Frequent observation of this bed showed the disease spreading from the bottom leaves to those halfway up the stem of plants in the button stage (July 21). A visit to Calvert and Prince Georges Counties (July 28) showed anthracnose still present on plants in the old tobacco plant beds. The upper leaves have fresh spots while the lower leaves are badly spotted and dried to a brown color.

The leaf spots are rounded to irregular in outline and similar in appearance on both sides of the leaf. Young spots are considerably depressed, greenish and water-soaked at first and increase from pin point to 1/16 to 1/8 inch in diameter. They lose their chlorophyll and in drying out become thinner, grayish white, and surrounded by a raised water-soaked area which later turns brown. Setae may be seen on these spots but spores are very scarce. As the tobacco seedlings begin to lift from the ground the disease spreads to the leaf midrib, lateral veins, and petiole. These lesions are water-soaked at first, and later become sunken to form oblong greenish brown lesions 1/4 to 1/2 inch in length. Many small lateral veins are killed and turn brownish-black causing that portion of the leaf to dry and turn brown. Anthracnose lesions also appear on the stem causing it to break easily when pulled for transplanting. The cankers on the stem, petiole, and midrib produce abundant pinkish spores scattered among brownish setae.

Cultures of Colletotrichum sp. isolated from diseased tobacco leaves and stems when grown on malt agar produce abundant pinkish conidia and numerous setae. Measurement of one thousand conidia averaged 14 x 4 microns. Healthy tobacco seedlings (Maryland strain 21) were inoculated by atomizing with spores from 10-day old malt agar cultures. Anthracnose symptoms were produced in 60 hours and some plants were dead the following day. The typical Colletotrichum sp., reisolated from these plants, cultured and reinoculated into a second series of healthy tobacco plants, produced symptoms on leaf and stem identical to those found in the plant bed. A Colletotrichum sp. was reisolated from this second inoculation test. Inoculation experiments are now being carried on with many wild and cultivated plants to determine the host range of the disease. Typical abundant anthracnose leaf spots have been produced on jimsom weed (Datura stramonium L.) and yellow dock (Rumex crispus L.) from which the Colletotrichum sp. was readily isolated.

A tobacco anthracnose was previously described from Brazil by Averna-Sacca (1) in 1922. He gave the name Colletotrichum nicotianae to the fungus. Böning (2,3), reporting an anthracnose from Germany in 1929, called the fungus concerned Colletotrichum tabacum. Later, in 1933 (4), he described a second anthracnose disease of tobacco caused by a Gloeosporium provisionally named G. nicotianae. Johnson and Valleau (5,6) described a tobacco anthracnose as it appeared in 1935 in the seed beds of the Kentucky Experiment Station. The organisum was determined as Colletotrichum destructivum O'Gara since apparently the disease spread into the tobacco plant bed from adjacent alfalfa and clover plantings affected by that fungus. The specific identity of the tobacco Colletotrichum in Maryland has not been determined.

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(Maryland Agricultural Experiment Station.)

PHOSPHATE DEFICIENCY OF SUGAR BEETS IN MONTANA

M. M. Afanasiev

The irrigated soils in Montana in many areas are deficient in available phosphates for the growth of certain crops, and sugar beets grown in these soils often develop symptoms of phosphate deficiency as they require a considerable amount of available phosphates for their normal development.

In soil deficient in available phosphates sugar beets, usually in July, show symptoms of phosphate deficiency, appearing as necrotic spots either on the edges of the leaves or between the veins. These spots enlarge and their color progresses from light to dark brown and finally to black. In severe cases many spots coalesce and finally the whole leaf blade begins to have the appearance of being burned and the leaves usually assume the form of a crescent with upward curling and with the tissue of the leaf practically black and dry like parchment. In severe cases this blackening of the leaves gradually progresses downward and all the petioles become black and dead. The veins and petioles usually retain their green color longer than the interveinal tissue. The beet root itself usually remains unaffected unless some molds start to decay the petioles and this decay progresses into the sugar beet root. If all the leaves of a sugar beet are killed a considerable time before harvest, the root usually becomes soft and may decay owing to infection with different rot-producing soil organisms.

Beets may show in some fields considerable variation in the degree of symptoms of phosphate deficiency. This difference in the behavior of individual beets may be due to a variation in their ability to absorb phosphate; to uneven distribution of available phosphates in the soil; or to a difference in the amount of available nutrients due to variation in stand.

The development of the symptoms of phosphate deficiency of sugar beets is believed to be due not only to the amount of available phosphates present in the soil, but also to the amount of available nitrogen. Sugar beets planted in soils poorly supplied with both these nutrients in the proper ratio to one another usually do not develop symptoms of phosphate deficiency. However, beets planted in soils with sufficient nitrogen but very low in phosphorus usually develop these symptoms, since plants well supplied with nitrogen require proportionally a high amount of phosphorus.

Sugar beets on land previously cropped to alfalfa for several years often are seriously affected with black root disease, and later those which survive develop acute phosphate deficiency. The nitrogen content of the ground is maintained during the growth of the alfalfa,

but the available phosphates are materially reduced. The ratio between these two plant foods is often unbalanced for succeeding crops and especially so for sugar beets. In fall plowed alfalfa ground only a small amount of nitrogen is available for the development of seedlings in early spring, as most of the nitrogen at that time is present in the form of ammonium salts and organic compounds of alfalfa residue. Nitrification of ammonium compounds and decomposition of organic material in early spring is not sufficient to supply sugar beets with nitrogen for their normal development. Sugar beets in their early stages of development, from the time of emergence to the beginning of intensive growth of the root, require a considerable amount of nitrogen and only a small amount of phosphorus and with this deficiency of nitrogen they grow slowly and become susceptible to seedling diseases.

Later in the season, when nitrification and decomposition of alfalfa remnants are more rapid owing to more favorable conditions, the seedlings surviving have proportionally more nitrogen than phosphorus, but when the enlargement of the sugar beet root takes place, the demand for phosphorus increases rapidly and the plants may show characteristic symptoms of phosphate deficiency.

(Department of Botany and Bacteriology, Montana Agricultural Experiment Station, Montana State College.)

RELATION OF FLEA BEETLE CONTROL TO CONTROL OF ALTERNARIA SOLANI ON TOMATOES

J.W. Heuberger and A.E. Dimond

Introduction

Evidence has recently been presented showing that derris and pyrethrum powders reduce the protective value of a fixed copper material against late blight (*Phytophthora infestans*) of potatoes (4), and that these same organic insecticides, as well as other organic materials containing considerable amounts of protein, reduce the fungicidal value of several copper compounds in the laboratory (2). These data indicate that the addition of derris or pyrethrum powders to copper fungicides will result in poorer control of plant diseases.

In a current tomato experiment designed to test the effect of various organic and inorganic materials on the protective value of copper compounds against *Alternaria solani*, derris powder was added to 4 copper sprays and 1 copper dust. At the first disease reading on July 28, 1941, it was surprising to find that copper materials to which derris was added were giving better control of early blight (*A. solani*) than the same copper materials used alone. This was contrary to expectation from published data (2,4), for instead of *reducing* control, derris *increased* it. This observation led to speculation as to the cause of the phenomenon.

Three explanations were possible: Derris improved the protective value of copper compounds; derris had fungicidal value; the insect control by derris was related somehow to the control of early blight. The first explanation was not tenable, as field data (4) show that derris reduces protective value; the second was not likely as derris in the laboratory has no fungicidal value (2); the third was the most probable as it has been reported (1,3) that flea beetles (Epitrix cucumeris) are associated with A. solani.

Records were taken to determine, if possible, if there were any relationship between flea beetle control and early blight control.

Data on the Experiment

The tomatoes (Scarlet Dawn variety) were transplanted during the week of May 24. By June 15, flea beetles had become so abundant in the field that derris dust (0.75 percent Rotenone) was applied. Spraying and dusting for control of early blight began on June 30, applications being made on June 30, July 10, 21, and 31. The copper sprays were used at the rate of 1.5 lbs. of metallic copper per 100 gallons of water; when derris was added, it was used at the rate of 4 lbs. The copper dusts contained 7 percent metallic copper; when derris was added, sufficient was used to give 0.75 percent Rotenone content. Unfortunately, derris was not used alone.

Records

On July 28 records were taken on the number of blight spots and severity of flea beetle damage per leaf. The 7th leaf from the top down on a main stem was selected, one leaf being taken from each of 9 plants, selected at random, for each treatment (table 1).

Table 1. Association of flea beetle injury and early blight lesions on tomatoes.

Material	Flea beetle injury[a/]				Early blight
	F	T	M	Sv	Total spots, 9 leaves
Check	-	2	6	1	327
Tribasic copper sulphate	-	8	1	-	257
ditto plus derris	2	5	2	-	72
Copper oxychloride	-	8	1	-	251
ditto plus derris	3	6	-	-	115
Yellow cuprous oxide	-	6	3	-	201
ditto plus derris	1	8	-	-	49
Red cuprous oxide, dust	-	6	2	1	190
ditto plus derris	3	6	-	-	91
Bordeaux	2	5	1	1	108
ditto plus derris	3	5	1	-	76

a/ Number of leaves in each group: F, free; T, trace; M, moderate; Sv, severe.

A second record was made on August 8, counts being made on the 10th leaf up from the crown on a main stem. One leaf was taken from each of 4 plants, selected at random, in each of 2 replicate plots for each treatment (table 2).

Table 2. Association of flea beetle injury and early blight lesions on tomatoes.

Material	Flea beetle injury a/				Early Blight
	F	T	M	Sv	Total spots, 8 leaves
Check	1	4	3	-	1010
Tribasic copper sulphate	5	2	1	-	320
ditto plus derris	6	1	1	-	69
Copper oxychloride	3	5	-	-	315
ditto plus derris	7	1	-	-	111
Yellow cuprous oxide	3	4	1	-	254
ditto plus derris	8	-	-	-	57
Red cuprous oxide, dust	4	4	-	-	295
ditto plus derris	8	-	-	-	105
Bordeaux	7	-	1	-	63
ditto plus derris	8	-	-	-	36

a/ Number of leaves in each group: F, free; T, trace; M, moderate; Sv, severe.

Discussion

The data in Tables 1 and 2 indicate that the control of flea beetles results in better control of early blight, for when derris was added to the copper materials flea beetle injury was less and blight spots fewer. This was true for every copper material used, whether spray or dust.

In the above connection, the data on bordeaux mixture are interesting. As bordeaux is a repellent for flea beetles it should give better flea beetle control than other copper compounds. The data show that it did and, in addition, show also that it had fewer blight lesions than other copper compounds. When derris was added the flea beetle injury was less and blight lesions fewer, but the reduction was not so pronounced as for other materials.

The data reported herein, showing that the addition of derris to copper compounds resulted in better early blight control, are contrary to field data (4) and laboratory data (2) showing that derris has a deleterious effect on the fungicidal efficiency of copper compounds. The contradiction is more apparent than real, however, when the following

facts are assembled:

1. Alternaria solani is more of a wound parasite than a direct parasite. On the other hand, Phytophthora infestans is a direct parasite.

2. A. solani has been reported to gain entrance to the leaf through flea beetle punctures and other injuries (1,3).

3. A. solani spores may be carried by flea beetles (1,3).

Thus control of flea beetles may aid in control of infection by A. solani in 2 ways, namely: by reducing the number of infection courts, and by cutting down on the dissemination of spores.

The authors wish to stress that the evidence presented is circumstantial only. Before definite statements can be made in regard to flea beetle control resulting in better control of early blight on tomatoes, the following information is necessary: Does derris, as well as other materials for flea beetle control, show control of early blight when used alone; are infection spots definitely associated with flea beetle punctures; and can experimental transmission of A. solani by flea beetles be demonstrated?

Summary

An observation, supported by circumstantial evidence, has been made that the addition of derris powder to several copper sprays and one copper dust improved control of early blight on tomatoes over that shown by the same copper materials used alone. This improvement in control apparently is related to control of flea beetles. The copper compounds used were bordeaux mixture, copper oxychloride, tribasic copper sulphate, red cuprous oxide, and yellow cuprous oxide.

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(Department of Plant Pathology and Botany,
Connecticut Agricultural Experiment Station,
New Haven, Connecticut.)

BACTERIAL RING ROT OF POTATO IN NEW HAMPSHIRE

M. C. Richards

In 1940 2 potato samples were sent in which contained ring rot [Phytomonas sepedonica]. Both of these samples, I have just learned, came from farms just over the line in neighboring States.

This spring, however, tubers were sent in from West Rindge, New Hampshire, that contained ring rot. These tubers were taken from a 100-bushel lot saved for seed, and were one year removed from certified stock.

A thorough survey for ring rot in the table-stock-growing areas of the State has not been made. On August 18, 1941, 6 farms were inspected in the Exeter area. All these farms are growing out-of-state certified seed of the Chippewa, Kathadin, Sebago, and Green Mountain varieties. Ring rot was found on 2 farms, in both cases in Chippewas.

A more careful search for ring rot has been made both in the bins and in the fields in the certified-seed-growing area, which is in the northern part of Coos County. As yet no ring rot has been found. Most of the certified-seed growers are planting Green Mountain stock brought into that section 20 years ago; consequently, there is little chance that ring rot will develop in the certified-seed area where this seed is planted.

(New Hampshire Agricultural Experiment Station.)

BRIEF NOTES ON PLANT DISEASES

YELLOW-RED VIROSIS IN PENNSYLVANIA: Yellow-red virosis or "X" disease was noted on August 16 in the southern parts of Venango and Clarion Counties in Northwestern Pennsylvania on chokecherry (Prunus virginiana). Many areas of the chokecherry were observed to be over half-killed by the disease indicating they have probably been infected for more than this season. No opportunity was available to scout peach orchards adjacent to these diseased chokecherries for the disease. This is not in the peach-growing section of Pennsylvania. (Harold J. Miller, Pennsylvania State College.)

FIRE BLIGHT ON APPLES IN NEW HAMPSHIRE: In June a moderate incidence of fire blight [Erwinia amylovora] was found on early apple varieties in the Gilsum area in Cheshire County. This is the third time in the past 11 years, according to C. C. Rawlins, the Extension Horticulturist, that fire blight on apples has been reported in the State. (M. C. Richards, New Hampshire Agricultural Experiment Station.)

HELMINTHOSPORIUM BLIGHT OF CORN IN PENNSYLVANIA: Helminthosporium turcicum is very seriously affecting certain fields of the hybrids Pioneer and U.S. 32 in Adams County. Infection appears to be fairly general over the fields but is particularly severe in the vicinity of buildings where cattle have been fed fodder. About 2/3 of the leaves of the stalks in the severely affected areas are killed. Abundance of inoculum seems to offer an explanation for the severe outbreaks near the feeding yards. (Harold J. Miller, Pennsylvania State College. August 22.)

TULIP MOSAIC IN NEW HAMPSHIRE: An interesting case of "running-out" in tulips due to mosaic [virus] was encountered this spring. A grower in Portsmouth obtained tulip bulbs from Holland 22 years ago. The progeny from these bulbs has been planted in the same garden, but not in the same location, each year since. The extra bulbs have been given away to his neighbors. The larger bulbs have always been selected for planting the following year. This spring out of a thousand plants only one was normal. All the rest showed "breaking" of the petals and the plants were greatly stunted. Under the conditions found in this Portsmouth garden, it had taken about 22 years for the tulip bulbs to "run-out." (M.C. Richards, New Hampshire Agricultural Experiment Station.)

SECOND NEW YORK X-DISEASE CLINIC A SUCCESS

E. M. Hildebrand and D. H. Palmiter

The recent Disease Clinic of July 22 was attended by G. H. Berkeley and R. S. Willison of the Dominion Laboratory of Plant Pathology, St. Catharines, Ontario; J. E. Howitt and R. W. Thompson of Ontario Agricultural College at Guelph; C. C. Allison and H. F. Winter of Ohio; H. J. Miller and H. W. Thurston, Jr. of Pennsylvania; E. M. Stoddard of Connecticut; A. B. Buchholz, Albany, New York; D. H. Palmiter, Poughkeepsie; D. M. Dalrymple, Lockport; L. C. Strickland, Lockport; J. E. Dalrymple, Albion; E. M. Hildebrand, Ithaca and County Agent J. G. Goodrich of Gasport who had charge of the tour.

The tour included 4 stops to see X-disease orchards and control experiments for eradicating chokecherries and in addition visits to orchards to see the "prune dwarf" disease, apple measles, perennial peach canker, fire blight in pear, a well-cared-for apple orchard, and gas storage. The first roundtable was held in the Park Hotel at Lockport on the evening of July 21. After the tour next day which ended in visits to Fort Niagara and Niagara Falls, the meeting was climaxed by a banquet and roundtable at Hotel Niagara, Niagara Falls.

The discussions brought out 2 ideas of interest to phytopathologists elsewhere: (1) the advisability of having a center somewhere in this country where stone fruit viruses could be compared and

identified, and (2) the need for what might be called "rules of proof" for the identification of viruses employing certain test varieties and procedures that would aid in distinguishing a given virus disease under different environmental conditions. These identical ideas were expressed at the first X-Disease Clinic at Hudson in 1939. Although no action was taken it is believed that an informal committee should be selected to look into the possibilities under the aegis either of the American Phytopathological Society or of the group of workers now engaged in investigations on stone-fruit viruses.

(New York State College of Agriculture.)

CHECK LIST REVISION

Freeman Weiss

MYRCIA (MYRTACEAE)

MYRCIA spp. Trees or shrubs of tropical America, some of timber value, others grown for edible fruit and ornament.

Asterina myrciae Ryan, black leaf spot. P.R.
Catacauma myrciae (Lév.) Theiss. & Syd., black leaf spot. P.R., Virgin Is.
Cephaleuros virescens Kze., green scurf. P.R.
Echidnodella myrciae Ryan, black leaf spot. P.R.
Meliola helleri Earle, black mildew. P.R.
Phyllachora myrciae (Lév.) Sacc., black leaf spot. P.R.
Triposporium stelligerum Speg., on leaves. P. R.

MYRICA (MYRICACEAE)

MYRICA CALIFORNICA Cham., PACIFIC WAXMYRTLE. Evergreen shrub or small tree of Growth Regions 1 and 5.

Cronartium comptoniae Arth., rust (?I,III). Oreg.
Lophodermium hysterioides (Pers. ex Fr.) Sacc., on leaves. Calif.
Phyllosticta myricae Cke., leaf spot. Calif.

MYRICA CARCLINENSIS Mill., BAYBERRY. Semi-evergreen shrub of Growth Regions 20, 24, 26, 27, 28, 29, 30.

Apioporthe phomaspora (Cke. & Ell.) Wehm., on twigs. N.J., N.Y.
Asterella myricae Miles, on leaves. Miss.
Gymnosporangium ellisii (Berk.) Farl., (Aecidium myricatum Schw.), rust (O,I). Mass to N. Y. and Va. (III on Chamaecyparis thyoides.)
Haplosporella lathami Dearn., on dead twigs. N.Y.
Mycosphaerella myricae Miles, leaf spot. Ga., Miss.
Phyllosticta myricae Cke., leaf spot. N. Y.

MYRICA -- continued

MYRICA CERIFERA L., WAXMYRTLE. Evergreen shrub or small tree of Growth Regions 20, 24, 28, 29, 30, 31, 32.

Apioporthe phomaspora (Cke. & Ell.) Wehm., on twigs. N. J.
Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., and var. chromogena Shear et al., on roots and branches. Ala., Fla.
Cercospora dispersa Ell. & Ev., leaf spot. N.J.
C. myricae Tr. & Earle, Miss., Texas.
C. penicillus Ell. & Ev., Miss., N.J.
Clitocybe tabescens (Scop. ex Fr.) Bull., root rot. Fla.
Gnomonia myricae Cke. & Ell., on leaves. Miss., N.J.
Gymnosporangium ellisii (Berk.) Farl., rust (O,I). Mass. to Md.
Glenospora curtisii Berk. & Desm., on twigs and leaves. Fla.
Irene (Appendiculella) calostroma (Desm.) Höhn., black mildew. Gulf States, P.R.
Irenina manca (Ell. & Ev.) F. L. Stevens, black mildew. Miss.
Mycosphaerella pardalota Cke. & Ell., on leaves. N. J.
Nectria erubescens Desm., on leaves. Fla.
Pestalotia myricae Ell. & Mart., on leaves. Fla.
Phyllosticta myricae Cke., leaf spot. N.J. to Fla., Texas.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physalospora obtusa (Schw.) Cke., on branches. Fla.
Poria pulchella (Schw.) Cke. (P. alabamae (Berk.& Cke.) Sacc.), on dead wood. Fla.
Rhizoctonia solani Kühn, seedling blight. N.J.
Septobasidium spp. (S.curtisii (Berk.& Desm.) Boed. & Stein., S. pseudopedicellatum Burt, and S. sinuosum Couch), on scale insects infesting branches. Southeastern States.
Septoria myricae Ell. & Ev., leaf spot. N.J.
Stagonospora myricae Ell. & Ev., on leaves. N. J.

MYRICA GALE L., SWEETGALE. Deciduous shrub of Growth Regions 1, 2, 4, 21, 23, 24, 26, 27.

Apioporthe phomaspora (Cke. & Ell.) Wehm., on twigs. N. Y.
Ciboria acerina Whetzel & Buchwald, on catkins. N.Y.
Cronartium comptoniae Arth., rust (II,III). Me. to N. Y., Washington, Alaska. (O and I on Pinus spp.)
Diplodia sp., twig blight. N.J.
Gymnosporangium ellisii (Berk.) Farl., rust (O,I). Me.
Leptosphaeria myricae Dearn. & House, on twigs. N.Y.
Metasphaeria myricae Pk., on dead twigs. N.Y.
Ovularia destructiva (Phill. & Plowr.) Mass., on twigs. New England, Wis., Alaska.
Ramularia monilioides Ell. & Mart., leaf spot. N.Y.
Septoria myricata Dearn. & House, Leaf spot. N.Y.

MYROXYLON (LEGUMINOSAE)

MYROXYLON Spp. Trees of tropical America, grown for balsam.

Meliola xylosmae F.L. Stevens, black mildew. Canal Zone.
Trabutia xylosmae F.L. Stevens, black leaf spot. Canal Zone.

MYRSINE (MYRSINACEAE)

MYRSINE spp. Shrubs or trees of S. Asia, sometimes grown for ornament in Hawaii and S. U.S.

Hendersonia nitida Ell. & Ev., on leaves. T.H.
Stomiopatella suttoniae Mendoza, black leaf spot. T.H.

MYRTUS (MYRTACEAE)

MYRTUS COMMUNIS L., MYRTLE. Evergreen shrub of Mediterranean region, cult. since antiquity for ornament and perfume; grown in S. U.S. as hedge plant.

Pestalotia decolorata Speg., leaf spot. La.
Sclerotium rolfsii Sacc., stem rot. Fla.

NANDINA (BERBERIDACEAE)

NANDINA DOMESTICA Thunb. Evergreen shrub of E. Asia, cult. for ornament in S. U.S.,Zone VII.

Cercospora nandinae Nagatomo, leaf spot. Ala.
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose. Texas.
Heterodera marioni (Cornu) Goodey, root knot. N.Car.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.

NECTANDRA (LAURACEAE). Shrubs or trees of tropical America.

Asteridium portoricense Speg., black leaf spot. P.R.
Cephaleuros virescens Kze., green scurf. P.R.
Helminthosporium glabroides F.L.Stevens, on leaves, P.R.
Irenina (Meliola) glabroides F.L.Stevens, black mildew. P.R.
Lembosia microspora Chardon, black mildew. P.R.
Phyllachora litseae Koord., black leaf spot. Canal Zone.
P. nectandrae Stevens & Dalby, P.R., Virgin Is.

NEMOPANTHUS (AQUIFOLIACEAE)

NEMOPANTHUS MUCRONATA (L.) Trel., MOUNTAIN-HOLLY. Deciduous shrub of ornamental value of Growth Regions 21, 22, 23, 24, 26, 27.

Curreya peckiana Sacc., on dead twigs. N.Y.
Dermatea peckiana (Rehm) Groves, on twigs. Mich., N.Y.

NEMOPANTHUS -- continued

Durandiella nemopanthis (Pk.) Groves, on twigs. N.Y., Vt.
Godroniopsis nemopanthis Groves, on twigs. N.Y.
Micropera stellata (Ell.) Jacz. (M.nemopanthis Pk.), on twigs. N.Y. Conidial stage of Dermatea peckiana.
Microsphaera alni D.C. ex Wint., powdery mildew. N.Y., Wis.
Ramularia nemopanthus Cke. & Pk., leaf spot. N.H., N.Y., Vt., Wis.
Rhytisma ilicis-canadensis Schw., tar leaf spot. Me. to Pa. and Mich.
Sphaeronema peckii Sacc. & Syd. (S. caespitosum Pk.), on twigs. N.Y. Conidial stage of Godroniopsis nemopanthis.
Venturia curviseta Pk., on leaves. N.Y.

NERIUM (APOCYNACEAE)

NERIUM OLEANDER L., OLEANDER. Evergreen shrubs of the Mediterranean region, cult. for ornament in the open in S. U.S. and indoors in the North.

Capnodium elongatum Berk. & Desm. (C. nerii Rabh.), sooty mold. Gulf States.
Cercospora neriella Sacc., leaf spot. Ala., La.
C. repens Ell. & Ev., Texas
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Diaporthe sp., on branches. T.H.
Diplodia nerii Speg., on dead stems. Calif.
Gloeosporium sp., leaf spot. N.J. (? conidial stage of Glomerella cingulata).
Haplosporella nerii Sacc., on branches. Fla.
(Macrosporium nerii Cke.): Alternaria, leaf spot. Calif., Gulf States.
Phyllosticta nerii Westend., leaf spot. Gulf States, Mich., T.H.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physalospora obtusa (Schw.) Cke., on branches. T.H.
Phytomonas tonelliana (Ferraris) Adam & Pugsley (Pseudomonas savastanoi var. nerii C.O.Smith), bacterial gall. Ariz., Calif., Conn.
Septoria cleandrina Sacc., leaf spot. Fla., La.
Sphaeropsis sp., witches broom. Fla.
S. gouldiae Stevens & Plunkett, on leaves. T.H.

NYSSA (NYSSACEAE)

NYSSA spp. Occurring on various or undetermined spp.

Ceratostomella spp., blue stain of wood. General.
Daedalea confragosa Bolt. ex Fr. and D. unicolor, wood rot. Occasional.
Endoconidiophora coerulescens Münch and E. moniliformis (Hedgc.) Davidson, wood stain. Southern States.
Fomes applanatus (Pers. ex Fr.) Gill., butt rot, white mottled heart rot. Widespread.
F. connatus (Weinm. ex Fr.) Gill., white spongy heart rot. Conn.

NYSSA -- continued.

Glenospora curtisii Berk. & Desm., on branches. Widespread.
Lasiosphaeria pezizula (Berk.& Curt.) Sacc., grayish-olive stain of wood.
Lentinus betulinus L. ex Fr., wood rot. Cosmopolitan.
Lenzites betulina L. ex Fr., wood rot. Cosmopolitan.
L. corrugata Klotzsch, Ind.
Mycosphaerella nyssaecola (Cke.) Wolf, leaf spot. Southeastern States.
Myriangium duriaei Mont. & Berk., on scale insects infesting bark. Va. to Gulf States.
Pezizella oenotherae (Cke. & Ell.) Sacc. (Hainesia lythri (Desm.) Höhn. and Sclerotiopsis concava (Desm.) Shear & Dodge), on branches. Va.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Md., Ind., Texas.
Phyllosticta nyssae Cke., leaf spot. Southeastern States to Texas. Spermatial stage of Mycosphaerella nyssaecola.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Polyporus spp.; woodrot of logs & timber, sometimes on living trees. Spp. recorded include:
P. adustus Willd.ex Fr., Md., Miss.; P. cinnabarinus Jacq. ex Fr.; P. galactinus Berk., Tenn.; P. hirsutus Wulf. ex Fr., widespread; P. mutabilis Berk. & Curt., Ark., La.; P. pargamenus Fr., Ind.; P. resinosus Schrad ex Fr., Ind.; P. rhipidium Berk., Ark.; P. rigidus Mont., Ark., Miss.; P. supinus Sw. ex Fr., Texas; P. versicolor L. ex Fr., widespread.
Poria spp., wood rot; spp. reported include:
P. ambigua Bres., Fla.; P. robusta Karst., Ga.; P. semitincta (Pk.) Cke.; P. versipora Pers. ex Romell.
Schizophyllum commune Fr., on dead branches. Cosmopolitan.
Septobasidium spp., on scale insects on bark and branches. N.J. to Gulf States. Spp. recorded include:
S. curtisii (Berk. & Desm.) Boed. & Stein.; S. fumigatum Burt, S. langloisii Pat., S. pseudopedicellatum Burt, S. patouillardii Burt.
Stereum spp., wood rot. Spp. reported include:
S. fuscum Schrad. ex Quél., La.; S. hirsutum Willd. ex Fr., N.Y, Va.; S. lobatum (Kze.) Fr., Miss.; S. rameale Schw., Ind.; S. purpureum Pers. Ind.
Valsa spp. (V. ambiens Pers. ex Fr., V. nyssae Cke.) on dead branches. N.Y. to Va.
Valsaria apatosa Cke. & Ell., on dead branches. N.J., N.Y., Va.

NYSSA AQUATICA L., WATER TUPELO. Large deciduous tree of Growth Regions 25, 29, 30.

Aplopsora nyssae (Ell. & Tr.) Mains, rust (II,III). Ky., Miss., Texas.
Isothea nyssae Berk. & Curt., on leaves. ? S.Car.
Mycosphaerella nyssaecola (Cke.) Wolf (Phyllosticta nyssae Cke.) leaf spot. N. Car. to Ala.

NYSSA -- continued.

NYSSA SYLVATICA Marsh., TUPELO, BLACKGUM; including N. BIFLORA Walt., SWAMP TUPELO. Deciduous tree of Growth Regions 20, 22, 24, 25, 26, 27, 28, 29, 30.

Aplopsora nyssae (Ell. & Tr.) Mains, rust (II,III). Md. to Ala., Texas
Cercospora nyssae Tharp, leaf spot. Texas.
Cornularia hispida (Ell.) Sacc., on dead branches. N.J., Pa.
Dermatella cucurbitaria Cke., on twigs. N.J.
Leptothyrium dryinum Sacc., on leaves. Ala.
Melanconis nyssaegena Ell. & Ev., on dead branches. N.J.
Mycosphaerella nyssaecola (Cke.) Wolf (Phyllosticta nyssae Cke.), leaf spot. Mass. to Ga. and Mich.
Nectria sp., canker. Conn.
Pirostoma nyssae Tehon, leaf spot. Ill.
Sclerotinia nyssaegena (Ell.) Rehm, on fallen fruits. N.J.
Stagonospora nyssaecola Fairm., on twigs. N.Y.
Strumella coryneoidea Sacc. & Wint., canker. Northern Appalachians.
Sphaeronema hispidulum Ell., on branches. N.J., Va. (S. hispidulum Cda. has priority.)
Trametes rigida Berk. & Mont., wood rot. Gulf States.
Trematosphaeria subcollapsa Ell. & Ev., on branches. N.J.

OCOTEA (LAURACEAE)

OCOTEA spp. Trees or shrubs of tropical America; O. CATESBYANA (Michx.) Sarg. (=O.coriacea (Swartz) Britt.?) occurs in S. Fla.

Asteridiellina portoricensis (Speg.) Seaver & Toro, black leaf spot. P.R.
Cephaleuros virescens Kze., green scurf. P.R.
Helminthosporium ocoteae F.L.Stevens, on leaves. P.R.
Irenina (Meliola) glabroides F.L.Stevens, black mildew. P.R.
Lembosia microspora Chardon, black mildew. P.R.
Meliola ocoteae F.L.Stevens, black mildew. P.R.
Phyllachora catesbyana Chardon, black leaf spot. Fla.
P. nectandrae Stevens & Dalby, Virgin Is.
P. ocoteicola Stevens & Dalby, P.R.
P. perplexans Chardon, P.R.

OLEA (OLEACEAE)

OLEA EUROPAEA L. OLIVE. Tree of Mediterranean region, grown for fruit in Calif. and Ariz., and for ornament in the South and under glass.

Armillaria mellea Vahl ex Fr., root rot. Calif., Texas.
Asterina oleina Cke., black leaf spot. Fla., Ga.
Cycloclonium oleaginum Cast., peacock spot, leaf spot. Calif.
Heterodera marioni (Cornu) Goodey, root knot. Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Phytomonas savastanoi (EFS.) Bergey, bacterial knot. Calif.
Pratylenchus musicola (Cobb) Filip., in roots. Calif.

OLEA -- continued.

Bitter pit and dry rot of fruit -- physiological, associated usually with over-nutrition. Calif.
Exanthema or dieback -- physiological, associated with deficiency of organic matter and poor drainage. Calif.
Soft nose or blue nose -- physiological, limited to var. Sevillano, possibly related to moisture supply. Calif.

OLNEYA (LEGUMINOSAE)

OLNEYA TESOTA Gray, desert ironwood. Shrub or small tree of Growth Regions 10, 11.

Phoradendron californicum (Pursh) Nutt., mistletoe. Texas to Calif.

ONCOBA (FLACOURTIACEAE)

ONCOBA SPINOSA FORSK. Shrub of Arabia sometimes grown for ornament.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.

OPLOPANAX (ARALIACEAE)

OPLOPANAX HORRIDUM (Small) Miquel, DEVIL'S-CLUB. Deciduous shrub of Growth Regions 1, 2, 4, 12, 13, 24.

Cercospora daemonicola Sprague, leaf spot. Oreg.

ORMOSIA (LEGUMINOSAE)

ORMOSIA KRUGII Urb. Tree of West Indies.

Dicheirinia ormosiae (Arth.) Cummins, rust (II,III). P.R.

OSMANTHUS (OLEACEAE)

OSMANTHUS AMERICANUS (L.) Gray. DEVILWOOD. Evergreen shrub or small tree of Growth Regions 29, 30.

Asterina asterophora Ell. & Mart. and A. discoidea Ell. & Mart., black leaf spot. Fla., Ga.
Calonectria erubescens (Desm.) Sacc., on leaves. Fla.
Isariopsis carnea Ell. & Mart., on leaves. Fla.
Lembosia oleae Tr. & Earle, black mildew. Miss.
Meliola amphitricha Fr., black mildew. Fla. to Miss.
Mycosphaerella oleina (Cke.) Miller, on leaves. Ga.
Phyllosticta oleae Ell. & Mart., leaf spot. Fla., N.Car.
P. sinuosa Ell. & Mart. Fla., Miss.
P. terminalis Ell. & Mart. Fla.
Venturia formosa Ell. & Mart., on leaves. Fla.
Zukalia (Asterina) purpurea (Ell. & Mart.) Theiss., black leaf spot. Fla.

OSMANTHUS -- continued.

OSMANTHUS FRAGRANS Lour. (Olea fragrans Thunb.), SWEET-OLIVE. Evergreen shrub or small tree of E. Asia, cult. for ornament in the open in the South and as a pot plant under glass.

Asterina sp., black leaf spot. Miss.
Gloeosporium oleae Patterson, on leaves. Md. (? conidial stage of Glomerella cingulata.)

OSMANTHUS ILICIFOLIUS (Hassk.) Mouillef. (O. aquifolium Benth. & Hook.), HOLLY OSMANTHUS. Evergreen shrub or small tree of Japan, cult. for ornament, Zone VI.

Capnodium elongatum Berk. & Desm., sooty mold. Texas.
Fumago salicina (Pers.ex Fr.) Tul., sooty mold. Texas.
Heterodera marioni (Cornu) Goodey, root knot.
Phyllosticta oleae Ell. & Mart. and P. sinuosa Ell. & Mart., leaf spot. Texas.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Rosellinia necatrix (Hart.) Berl., root rot. Calif.

OSMANTHUS spp.

Asterinella intensa (Cke. & Mass.) Theiss., black leaf spot. T.H.
Aulacostroma osmanthi Stevens & Ryan, on leaves. T.H.
Calothyriella osmanthi Stevens & Ryan, on leaves. T.H.
Calothyrium osmanthi Stevens & Ryan, on leaves. T.H.
Fomes hawaiiensis Lloyd, wood rot. T.H.
Meliola osmanthi Syd., black mildew. T.H.

OSMARONIA (ROSACEAE)

OSMARONIA CERASIFORMIS (Torr. & Gray) Greene, OSOBERRY. Deciduous shrub of Growth Regions 1, 2, 4, grown for ornament.

Cylindrosporium nuttallii (Harkn.) Dearn., leaf spot. Calif. to Wash.
Gloeosporium osmaroniae Dearn., leaf spot. Wash.
Nectria subcoccinea Sacc. & Ell. (? N. muscivora Berk.), on branches. Calif.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Oreg.

OSTEOMELES (ROSACEAE)

OSTEOMELES spp. Evergreen shrubs of Asia and Polynesia grown for ornament in warm regions.

Irene calostroma (Desm.) Höhn., black mildew. T.H.
Physalospora obtusa (Schw.) Cke., on branches. T.H.

OSTRYA (BETULACEAE)

OSTRYA spp., mostly O. VIRGINIANA (Mill.) K. Koch, EASTERN HOP-HORNBEAM, IRONWOOD; a small forest tree of Growth Regions 15, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30. Other native spp. are var. GLANDULOSA (Spach) Sarg. of preceding, and O. KNOWLTONII Coville; and O. CARPINIFOLIA Scop., EUROPEAN HOP-HORNBEAM and O. JAPONICA, JAPANESE HOP-HORNBEAM are cult., Zone V.

Aleurodiscus griseo-canus (Bres.) Höhn. & Litsch., on bark of living trees. Iowa, Mo.
A. oakesii (Berk. & Curt.) Cke., N.Y. to Ala., Mo. and Wis.
Armillaria mellea Vahl ex Fr., root rot. Cosmopolitan.
Cylindrosporium dearnessii Ell. & Ev., leaf spot. Va.
Daedalea confragosa Bolt. ex Fr. and D. unicolor Bull. ex Fr., wood rot. Cosmopolitan.
Daldinia loculata (Lév.) Sacc.
Diaporthe eres Nits., on dead branches. Nebr., N.Y.
Fomes spp., white spongy or pocket heart rot, commonly of living trees, including especially the following spp.:
F. conchatus Fr., Vt.; F. connatus (Weinm. ex Fr.) Gill., Northeastern States; F. igniarius (L. ex Fr.) Kickx, widespread; F. ohiensis (Berk.) Murr.
Gloeosporium robergei Desm., leaf spot. Pa., Wis.
Gnomoniella fimbriata (Pers. ex Fr.) Sacc., on leaves. Me., N.Y.
Melampsoridium carpini (Nees) Diet., rust (II,III). N.Y.
Melanconis xanthostroma (Mont.) Schroet. (M. bitorulosa (Berk. & Br.) Ell. & Ev.), on dead branches. Iowa, Nebr., N.Y.
M. ostryae (Dearn.) Wehm. (Diaporthe ostryae Dearn.), on branches. Mich.
Melanconium bicolor Nees ex Fr., on branches. Iowa, N.Y.
M. zonatum Ell. & Ev., Iowa. (Reported associated with Melanconis bitorulosa.)
Microsphaera alni DC. ex Wint., powdery mildew. Widespread.
Nectria sp. and N. ditissima Tul., canker. N.Y., W.Va.
Phomopsis sordidula (Sacc.&Syd.) Trav., on branches. N.Y. Conidial stage of Diaporthe eres.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Widespread.
Physalospora obtusa (Schw.) Cke., on branches. N.Y.
Pleurotus similis Pk., sapwood rot. N.Y.
Polyporus spp., wood rot, sometimes on living trees. Occasional. Spp. reported include:
P. adustus Willd. ex Fr., P. cuticularis Bull. ex Fr., P. hirsutus Wulf. ex Fr., P. versicolor L. ex Fr.
Poria spp., wood rot. Numerous spp. reported, including P. ambigua Bres., P. ferruginosa (Schrad. ex Fr.) Cke., P. friesiana Bres., P. medulla-panis (Jacq. ex Fr.) Cke., P. punctata Fr., P. vaporaria Fr.
Septobasidium curtisii (Berk. & Desm.) Boed. & Stein. and S. pseudopedicellatum Burt, felt fungus. Tenn., W.Va.
Septoria ostryae Pk., on leaves and cones. N.Y., Wis.

OSTRYA -- continued.

Sphaerognominia carpinea (Fr.) Poteb., on leaves. Ga.
Stereum spp., including S. albobadium (Schw.) Fr., S. candidum Schw., S. rameale Schw; wood rot. Occasional.
Strumella coryneoidea Sacc. & Wint., canker. Northern Appalachians.
Taphrina virginica Seym. & Sadeb., leaf blister, witches'-broom. Widespread.
Uncinula macrospora Pk., powdery mildew. Mich., Wis.
Valsa ambiens Pers. ex Fr., on branches. Widespread.

OXYDENDRUM (ERICACEAE)

OXYDENDRUM ARBOREUM (L.) DC., SOURWOOD, SORREL-TREE. Deciduous tree of Growth Regions 25, 27, 28, 29, 30, grown for ornament, Zone IV.

Cercospora oxydendri Tr. & Earle, leaf spot. Ala., Miss., W.Va., Texas.
Godronia rugosa Ell. & Ev.
Mycosphaerella caroliniana Wolf, leaf spot. Ga., N.Car., Texas, W.Va.
Phoma sp., on twigs. N.Car. Conidial stage of Sphaerulina polyspora.
Phyllosticta oxydendri Ell. & Ev. Spermatial stage of Mycosphaerella caroliniana.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Poria punctata Fr., wood rot.
Rhabdospora oxydendri (Ell. & Ev.) Sherb., on bark. W.Va.
Sphaerulina polyspora Wolf, twig blight. N.Car.
Venturia oxydendri Wolf, on fallen leaves. N.Car.

(Division of Mycology and Disease Survey)